

Spectrum Sharing in 3.5 GHz Using Advanced Beacons

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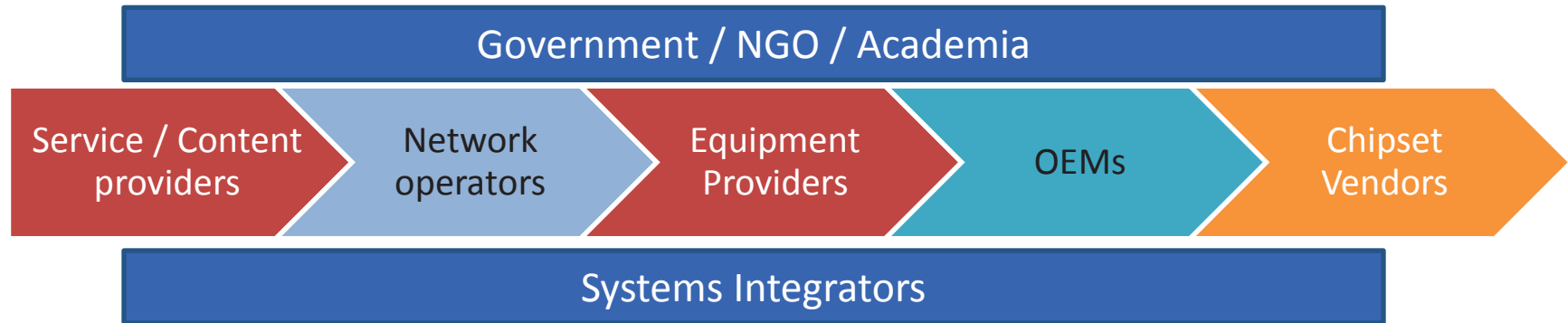
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This presentation supercedes an earlier Ex Parte filing made to the FCC Docket 12-354 which can be found [here](#)

This presentation was initially made at the [WSRD Meeting](#), July 2012, Boulder, Colorado. This presentation can also be found in the presentation made at the [ISART Symposium](#), 2012

WhiteSpace Alliance™ – www.WhiteSpaceAlliance.org



- WhiteSpace Alliance is a technology neutral organization – It promotes the use of unused and under-utilized spectrum
- WSA engages in market awareness and pilot and trials related activities
- The Alliance creates and simplifies standards
- WSA will conduct programs for inter-operability between products
- WSA plans to adopt IEEE, IETF and 3GPP Standards for use in the WhiteSpaces.



Radar, Commercial Comms Spectrum Sharing in 3550-3650 Bands in the US Using IEEE 802.22.1 Advanced Beacons

Objective To Create NATIONWIDE availability of the 3550-3650 MHz Band using IEEE 802.22.1 advanced beaoning approach

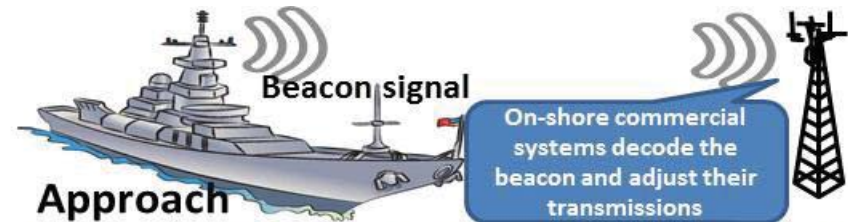
Current Plan: The current plan is the use of exclusion zones to protect U.S. Navy coastal operations and other Department of Defense test and training areas. This means that major part of the US population will not be able to use these bands.

Alternatives: However, there may be some other approaches which will make 100 MHz of spectrum available nation-wide, and especially in the coastal areas where significant US population resides.



Background

3550 – 3650 MHz Band: One of the portions of the spectrum identified to achieve the goal of freeing up 500MHz of spectrum, is the 3550-3650 MHz where maritime radars have been deployed.



Approach

Use of Advanced Beacons Approach: Advanced beaoning approaches, such as the one developed in the IEEE Standard 802.22.1 for spectrum sharing between the primary signals and incumbent signals is suitable for the 3550-3650 band.



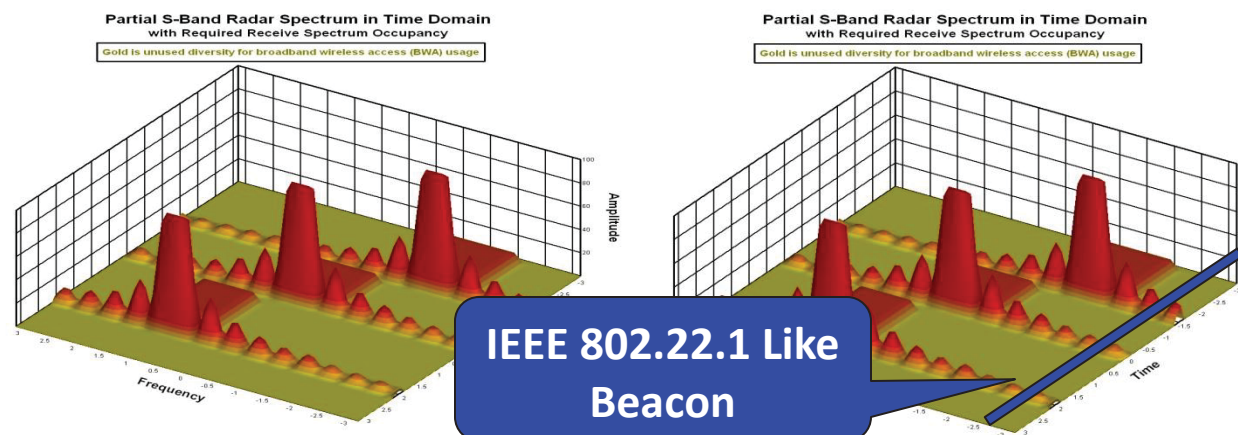
Deployment Strategy

Regulators have realized that beaoning is a viable option for spectrum sharing. *The IEEE 802.22.1-2010™ standard has been completed and is currently being revised for protection of radars and satellite earth stations*

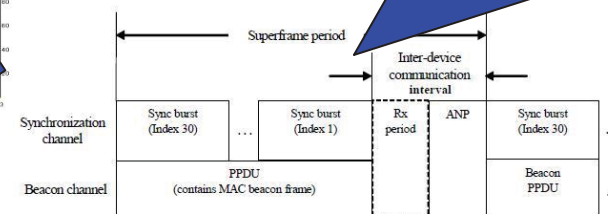
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How will it Work: The designed beacon will contain *Peace Time* temporal information of the radars, which when combined with some universal time clock can help commercial communications systems to use the empty time slots or frequency channels for their operation.

During *Emergency Scenarios*, the beacon will send Urgent Co-existence request, to ask all the commercial systems to shut down immediately. Security features for such beacons are very important. IEEE Std, 802.22.1-2010™ has incorporated many such security mechanisms that may be applied to the 3550-3650 band relatively readily.



Current IEEE 802.22.1 beacon protocol contains many security Features already

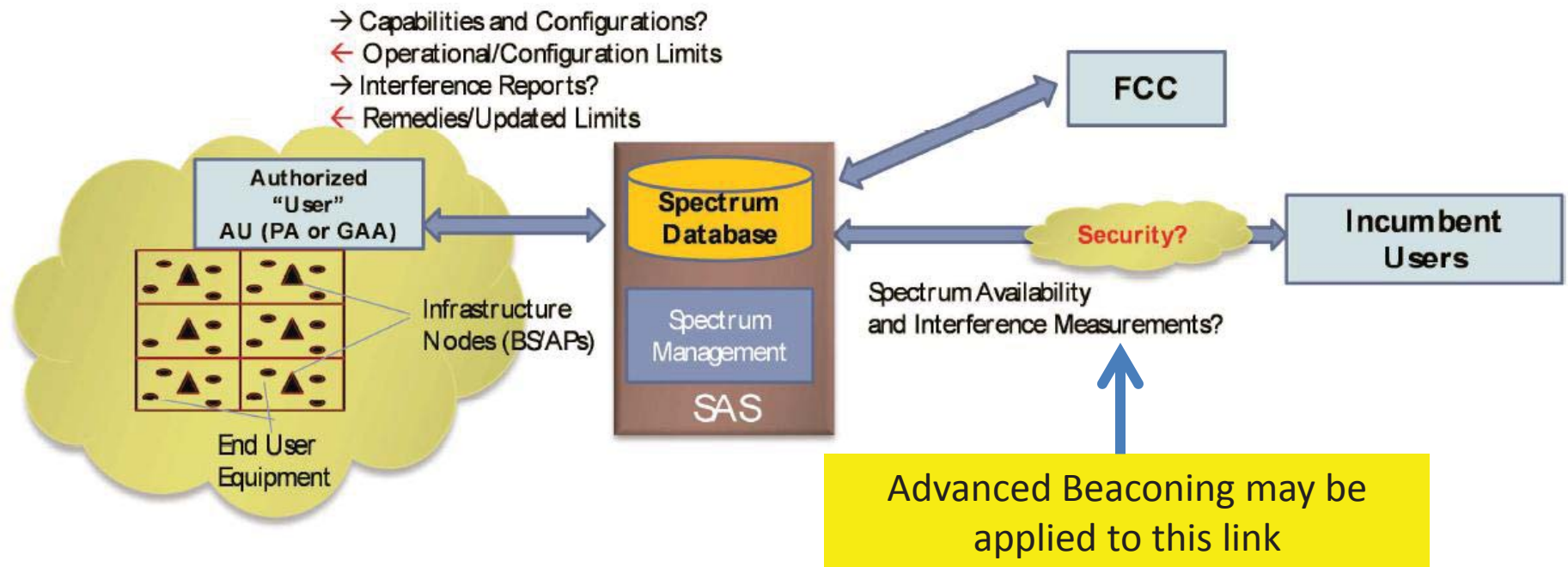


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Advanced Beacons With Respect to the Proposed Architecture



Spectrum Access System Proposed Architecture as shown in Figure 1, Document FCC 12-354, DA 13-2213

Conclusions

- WhiteSpace Alliance (WSA) supports opportunistic and more efficient utilization of spectrum enabled through database, sensing and beaconing technologies.
- WSA is a technology neutral organization and promotes the use of heterogeneous technologies including licensed, unlicensed (license-exempt) and lightly licensed operation (e. g. proposed Three Tier Approach) for the 3.5 GHz band.
- WSA agrees with the FCC that opening up the 3550-3700 MHz spectrum to radio sharing technologies will spur innovation to address meaningful communications needs of consumers, businesses and governments while also protecting incumbent mission critical needs such as various DoD systems.
- WSA is willing to work with the FCC, NTIA and other Govt organizations to leverage inter-operable spectrum sharing standards and create products for the 3.5 GHz Band.

WhiteSpace Alliance Comments on Docket 12-354 can be found here:

<http://apps.fcc.gov/ecfs/document/view?id=7022122443>